ISSN 1788-5345

THE INFLUENCE OF ORGANOMINERAL FERTILISATION ON CORN YIELD IN BANAT PLAIN

NIŢĂ SIMONA, NIŢĂ LUCIAN, JURJESCU ADELA, PANAITESCU LILIANA, LUNGU MARIUS

Banat University of Agricultural Sciences and Veternary Medicine Timişoara
suveti_s@yahoo.com

ABSTRACT - The influence of organomineral fertilization on corn yield in Banat Plain
The experience was conducted at the Teaching Resort of Banat's University of Agricultural Sciences and Veterinary Medicine of Timisoara, located in the Plain Banato-Crisan, Plain subunit Berecsău Bega-Timis interfluve. Research wes conducted on a chernozem soil, low gleyed, formed on decarbonated loesoide deposits. On average, the temperatures recorded in the studied experimental cycle were considered favorable to the corn crop. To prove the effect of the fertilization on the corn grain yield in the experimental cycle 2007-2009 trials were conducted in which the effect of manure as well as the effect of chemical fertilizers on the hybrid Andreea were monitored. The trials were organized by the "Latin Square" method, with five variants randomly arranged, applying 20 t/ha manure and 70 kg/ha P_2O_5 constant base different doses of nitrogen. On the average of the three years, the yield results varied among 9% increase when applying 50 kg/ha N, 22% increase when applying 100 kg/ha N, 28% increase when applying 150 kg/ha N and 33% increase when applying 200 kg/ha N, compared to the control variant. At applying 1 kg N active substance the average increase of grains was of 11.24 kg grains/1kgN when applying N50, 12.12 kg grains/1 kg N when applying N100, 10.41 kg grains/1 kg N when applying N150, 10.31 kg grains/1 kg N when applying N200. Research conducted in the experimental cycle of 2008-2010 to determine the influence of the fertilisation on the corn yield in the Banat Plain lead to the conclusion that organo-mineral fertilization is a important technological link for obtaining high yields for corn.

Key words: corn, manure, nitrogen fertilization

INTRODUCTION

Corn is the third place as importance among the cultivated plants in the world. This position, in terms of agriculture, is motivated by several features, such as a large capacity (about 50% higher compared to other cereals), high ecological plasticity, is a good pre-plant for most crops , monoculture tolerate for several years, has a high coefficient of multiplication (150-400), allows for better staging of agricultural work due to late sowing, mechanized culture is 100% recovered very organic and mineral fertilizers and irrigation water, valorization of production is very varied (NIŢĂ, 2004a,b).
Corn seeds are rich in no-nitrogen extractives (68-69%), proteins (over 10%), carbohydrates (including starch 61.0%) and lipids (4.5%) (NIŢĂ, 2006).

MATERIAL AND METHOD

The experiment was conducted at the Teaching Resort of Banat's University of Agricultural Sciences and Veterinary Medicine of Timisoara, located in the Plain Banato-Crisan, Plain subunit Berecsău Bega-Timis interfluves. Research wes conducted on a chernozem soil, low gleyed, formed on decarbonated loesoide deposits.
For the climatic characterisation of the 2008-2010 experimental cycle the recordings of the Meteorological Station of Timisoara were used, and are presented in Tables 1 and 2.

ISSN 1788-5345

Table 1: Temperatures recorded at Meteorological Station of Timisoara in the 2008-2010 experimental cycle, compared with the multiannual average

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2008	4	6	9	13	18	23	24	23	12	11	1.2	0.1
2009	1.7	4.8	8.6	13.1	23	22.5	20.7	21	15.3	12.3	7	0.8
2010	0.3	2	7.2	16	19	21.2	24	23.7	20	12.3	8.3	4.3
Multiannual average	1.2	0.4	6	11	17	20	22	21	17	11	5.7	1.4

During the year 2008 the average temperatures were very close to the multiannual average, and were considered as favorable for the crop. The temperature values during flowering, fecundation and grain ripening were quite close to the multiannual average. In terms of thermal regime, the year 2010 was warmer than the usual, the monthly average being over the multiannual average.

On average, the temperatures recorded in the studied experimental cycle were considered favorable to the corn crop.

Table 2: Rainfall recorded at Meteorological Station of Timisoara in the 2008-2010 experimental cycle, compared with the multiannual average

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2008	26	92	4	69	65	46	65	62	53	53	86	23
2009	45.7	22.6	119	61.4	62.2	230.8	61.1	29.6	67.1	25.9	53	55
2010	31	29	52	25	47	115	42	31	4	10	106	42
Multiannual average	41	40	50	67	81	60	52	46	55	55	49	48

During the year 2008, in the April-October period, the rainfall values recorded each month were close to the multiannual average. It can be observed that the autumn of 2010 had an excess in pluviometric regime to the other years.

From those presented, we can conclude that in the reference territory the pluviometric regime offers favorable conditions for the corn crop, in most years.

To prove the effect of the fertilization on the corn grain yield in the experimental cycle 2008-2010 trials were conducted in which the effect of manure as well as the effect of chemical fertilizes on the hybrid Andreea were monitored. The trials were organized by the "Latin Square" method, with five variants randomly arranged.

The studied variants were:

- V1: 20 t/ha manure + N_0P_{70}
- V2: 20 t/ha manure + $N_{50}P_{70}$
- V3: 20 t/ha manure + $N_{100}P_{70}$
- V4: 20 t/ha manure + $N_{150}P_{70}$
- V5: 20 t/ha manure + $N_{200}P_{70}$

ISSN 1788-5345

RESULTS AND DISCUSSIONS

The results from the studied experimental cycle are presented in the Tables 3, 4 and 5.

Table 3: The results obtained in Banat Plain in the year 2008

Variant	Yield (kg/ha)	%	Difference	Significance
20 t/ha manure + N0P70	6150	100	-	Mt.
20 t/ha manure + N50P70	7002	113	852	X
20 t/ha manure + N100P70	7682	124	1532	XXX
20 t/ha manure + N150P70	8052	130	1902	XXX
20 t/ha manure + N200P70	8310	135	2160	XXX

DL5% = 601 kg/ha DL1% = 950kg/ha DL 0,1% = 1209 kg/ha

The yield from this year varied from 6150 kg/ha in the control variant to 8310 kg/ha in the fifth variant.
The increase caused by fertilization ranged from 13% in the second variant to 35%, in the fifth variant. The increase is statistically over the significance level.
We can conclude that in the dry year 2008, in which the fertilizers were only partially used, the grain increase at 1 kg N active substance was of 6.4 kg grains/1 kg N and 9.95 kg grains/1 kg N.The best results were recorded at N_{100} dose.

Table 4: The results obtained in Banat Plain in the year 2009

Variant	Yield (kg/ha)	%	Difference	Significance
20 t/ha manure + N0P70	7010	100	-	Mt.
20 t/ha manure + N50P70	7525	107	515	X
20 t/ha manure + N100P70	8120	115	1110	XX
20 t/ha manure + N150P70	8630	123	1350	XXX
20 t/ha manure + N200P70	9050	129	2040	XXX

DL5% = 456 kg/ha DL1% = 901 kg/ha DL 0,1% = 1150 kg/ha

During this year, as the result of the favorable climatic conditions, the level of the yield was much bigger than the previous year. So, in the control variant the yield was 7010 kg/ha.
The increasing of the nitrogen dose, resulted in a yield increase of 515 kg/ha in the second variant, statistically significant, 1110 kg/ha in the third variant, statistically very significant, 1350 kg/ha and 2040 kg/ha in the fourth and fifth variant, statistically distinctive significant.
The grain increase at 1 kg N active substance was from 10.3 kg grains/1 kg N in the control variant to 11.10 kg grains/1 kg N in the third variant.
From this point of wiew, incresing the dose of nitrogen to 150 kg/ha and 200 kg/ha is not been justified.
In the third year of experience the yield amplitude varied from 7380 kg/ha in the control variant to 9972 kg/ha in the fifth variant.
The nitrogen fertilizers, applied on a 20 t/ha manure base increased the yield by 7 % in the second variant, by 25% in the third variant, by 31%, in the fourth variant and by 35% in the fifth variant.

ISSN 1788-5345

Table 5: The results obtained in Banat Plain in the year 2010

Variant	Yield (kg/ha)	%	Difference	Significance
20 t/ha manure + N0P70	7380	100	-	Mt.
20 t/ha manure + N50P70	7950	107	570	X
20 t/ha manure + N100P70	9218	125	1838	XXX
20 t/ha manure + N150P70	9662	131	2282	XXX
20 t/ha manure + N200P70	9972	135	2592	XXX

DL5% = 456 kg/ha DL1% = 901 kg/ha DL 0,1% = 1150 kg/ha

As for the grain increase at 1 kg N active substance there was registered an increase of 17.04 kg/ha, when applying 50 kg N active substance. When increasing the dose, the grain increase at 1 kg/ha N active substance suffered a decrease to 15.32 kg grains/1 kg N, when applying 100 kg N active substance, 12.69 kg grains/1 kg N, when applying 150 kg N active substance, and 10.8 kg grains/1 kg N, when applying 200 kg N active substance.

CONCLUSIONS

The research conducted in the experimental cycle 2008-2010 to determine the influence of the fertilisation on the corn yield in the Banat Plain lead to the following conclusions:

5. The hybrid Andreea, used in the experience, is adapted to the area, in the climatically favorable years and in appropriate technology conditions resulting yields of 8-10 t/ha grain.
6. Applyed on a 20 t/ha manure and 70 kg/ha P_2O_5 constant base, nitrogen fertilizers determined an increase in yield of 9% at applying 50kg/ha N, 22% at applying 100 kg/ha N, 28% at applying 150 kg/ha N and 33% at applying 200 kg/ha N.
7. On the chernozem soil, low gleyed, formed on decarbonated loesoide deposits, characteristic to the area in which the experience was conducted, the organo-mineral fertilization is an important technological link for obtaining high yields for corn.

REFERENCES

1. Niţă, S., (2004a): Tehnologii de cultivare pentru cereale – leguminoase cultivate pentru boabe şi plante tehnice. Eurobit Press, Timişoara, pp. 61-87.
2. Niţă, S., (2004b): Fitotehnie. Eurobit Press, Timişoara, pp. 45-63.
3. Niţă S., (2006): Tehnologia culturilor de câmp, pp. 60-88.